

A high-speed photograph of a large splash of water, creating a complex, textured shape with many droplets and air bubbles. The water is white and frothy, set against a solid teal background. The splash is centered vertically and horizontally, with the text overlaid on its right side.

Volume 1

Chapter 2 – A Framework for Action

Chapter 2 A Framework for Action

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Integrated regional water management is an approach that will help communities and regions incorporate sustainability actions into their water management efforts. (DWR photo)

Chapter 2 *A Framework for Action*

About This Chapter

Chapter 2 A Framework for Action describes the role of State government in supporting regional water management and improving statewide water management systems. It lays out the foundational actions that must be followed as part of sustainable water resource management, and it explains key initiatives that will stimulate progress and assure that Californians have enough water through 2030. The near-term actions listed under each initiative are part of the implementation plan outlined in Chapter 5.

- The Framework
- Fundamental Lessons
- Ensuring Sustainable Water Uses
- Ensuring Reliable Water Supplies
- Performing Essential Support Activities
- Looking to the Future

The Framework

California can contend with its water resources challenges. However, we must take action now and be prepared to make significant investments. In facing these challenges, we must apply the fundamental lessons of recent decades. Notable among those lessons, and a primary theme of California Water Plan Update 2005, is that our policies, decisions, and actions must lead to long-term, sustainable water resource use that enhances our environment, our economy, and our communities. With creativity, flexibility, discipline, and innovation we can use our groundwater and surface water resources wisely in ways that sustain their viability, expand the economy, protect the environment, and assure Californians a high quality of life. The framework outlined in this chapter sets forth policies and actions to ensure sustainable water uses and reliable water supplies.

The water plan provides a Framework for Action, or roadmap, that lays out the role of State government and the water community to ensure that California has sustainable water uses and reliable water supplies in 2030 for all beneficial uses.

As a strategic document, California Water Plan Update 2005 can guide us toward meeting statewide and regional water challenges through 2030. It is the first water plan update to include a strategic plan with a vision, mission, recommendations, and implementation plan (See Box 2-1 The Strategic Plan: Vision, Mission, Goals, and Recommendations).

The water plan provides a Framework for Action, or roadmap, that lays out the role of State government and the water community to ensure that California has sustainable water uses and reliable water supplies in 2030 for all beneficial uses.

The framework identifies three foundational actions—use water efficiently, protect water quality, and support environmental stewardship—that will ensure sustainable water uses. These foundational actions must be central to California water management and will guide us in carrying out two key initiatives that can ensure that we have reliable water supplies through 2030:

- 1) implement integrated regional water management and
- 2) improve statewide water management systems.

This water plan update also identifies a number of support activities that are essential to all the foundational actions and initiatives.

Figure 2-1 A Framework for Action



By basing California water management on key features of the Framework for Action—foundational actions and initiatives—we can attain the water plan’s vision of a vital economy, a healthy environment, and a high standard of living.

The Framework for Action is intended to stimulate progress toward meeting California’s water challenges while building a future that assures water resources are available for future generations. By basing California water management on the framework’s foundational actions and concurrently implementing its two initiatives, we can attain the water plan’s vision of a vital economy, a healthy environment, and a high standard of living (see Figure 2-1 A Framework for Action).

Fundamental Lessons

The Framework for Action embodies the following fundamental lessons, learned by California’s water community through the experience of recent decades.

- Solutions to California’s water management issues are best planned and carried out on a regional basis. Hydrological, demographic, geopolitical, socioeconomic, and other differences among California’s regions demand that the mix of water management strategies be suited to meet each region’s needs for the long term.
- State government has a lead role in coordinating the water management activities of federal, regional, and local governments and agencies, and to develop sustainable methods for financing water management actions.
- The practice of water conservation and recycling in California has grown dramatically and must continue as a fundamental strategy for all regions and individual water users in California. The cumulative effect of each decision to use water more efficiently has an enormous impact on future water supplies and water quality.
- California must protect the quality of its water and use available supplies with great efficiency because water will always be a precious resource.
- California needs additional groundwater and surface water storage capacity. Storage gives water managers tremendous flexibility to meet multiple needs and provide vital reserves in drier years.

- Sustainable development and water use foster a strong economy, protect public health and the environment, and enhance our quality of life. Sustainable development relies on the full consideration of social, economic, and environmental issues in policy- and decision-making. Sustainable water use ensures that we develop and manage our water and related resources in a way that meets present needs while protecting our environment and assures our ability to meet the needs of the future.
- Science and technology are providing new insights into threats to our watersheds, including our waterways and groundwater basins. California must use this knowledge to take protective actions and manage water in ways that protect and restore the environment.

Box 2-1 The Strategic Plan: Vision, Mission, Goals, and Recommendations

The Department of Water Resources (DWR) has changed the process for preparing the California Water Plan update and the type of information it contains. The water plan has become a strategic planning document that describes the role of State government and the growing role of California's regions in managing the state's water resources. As a strategic planning document, this water plan provides California's water communities with a vision, mission, and goals for meeting challenges of sustainable water uses through 2030 in the face of uncertainty¹.

Vision

The vision statement of Update 2005 describes the desired future for California water resources and management and serves as a foundation for water planning during the next 25 years.

California's water resource management preserves and enhances public health and the standard of living for Californians; strengthens economic growth, business vitality, and the agricultural industry; and restores and protects California's unique environmental diversity.

Mission

The mission statement of Update 2005 describes the water plan's unique purpose and its overarching reason for existence. It identifies what it should do and why and for whom it does it.

To develop a strategic plan that guides State, local, and regional entities in planning, developing, and managing adequate, reliable, secure, affordable, and sustainable water of suitable quality for all beneficial uses.

Goals

The following goals are the desired outcome of this water plan over its planning horizon to 2030. The goals are founded on the statewide vision. Meeting the goals requires coordination among State, federal, and local governments and agencies.

- *State government supports good water planning and management through leadership, oversight, and public funding.*
- *Regional efforts play a central role in California water planning and management.*
- *Water planning and urban development protect, preserve, and enhance environmental and agricultural resources.*
- *Natural resource and land use planners make informed water management decisions.*
- *Water decisions and access are equitable across all communities.*

continued

¹ AB 857 (Stats 2000; ch. 1016) establishes three planning priorities and requires that all State strategic plans, including the California Water Plan be consistent with them. (See "Coordination of Water and Land Use Planning" in Chapter 3 California Water Today.)

Box 2-1 continued from previous page

Recommendations

California Water Plan Update 2005 provides recommendations for the next 25 years. These recommendations are directed at decision-makers throughout the state (referred to as California), the executive and legislative branches of State government, and DWR and other State agencies. (See Chapter 5 Implementation Plan for details.)

1. California must invest in reliable, high quality, sustainable, and affordable water conservation, efficient water management, and development of water supplies to protect public health, and improve California's economy, environment, and standard of living.
2. State government must provide incentives and assist regional and local agencies and governments and private utilities to prepare integrated resource and drought contingency plans on a watershed basis; to diversify their regional resource management strategies; and to empower them to implement their plans.
3. State government must lead an effort with local agencies and governments to remediate the causes and effects of contaminants on surface water and groundwater quality.
4. California must maintain, rehabilitate, and improve its aging water infrastructure, especially drinking water and sewage treatment facilities, operated by State, federal, and local entities.
5. State government must continue to provide leadership for the CALFED Bay-Delta Program to ensure continued and balanced progress on greater water supply reliability, water quality, ecosystem restoration, and levee system integrity.
6. State government must lead in water planning and management activities that: (a) regions cannot accomplish on their own, (b) the State can do more efficiently, (c) involve inter-regional, inter-state, or international issues, or (d) have broad public benefits.
7. California must define and articulate the respective roles, authorities, and responsibilities of State, federal, and local agencies and governments responsible for water.
8. California must develop broad, realistic, and stable funding strategies that define the role of public investments for water and other water-related resource needs over the next quarter century.
9. State government must invest in research and development to help local agencies and governments implement promising water technologies more cost effectively.
10. State government must help predict and prepare for the effects of global climate change on our water resources and water management systems.
11. DWR and other State agencies must improve data, analytical tools, and information management and exchange needed to prepare, evaluate, and implement regional integrated resource plans and programs in cooperation with other federal, tribal, local, and research entities.
12. DWR and other State agencies must explicitly consider public trust values in the planning and allocation of water resources and protect public trust uses whenever feasible.
13. DWR and other State agencies must invite, encourage, and assist tribal government representatives to participate in statewide, regional, and local water planning processes and to access State funding for water projects.
14. DWR and other State agencies must encourage and assist representatives from disadvantaged communities and vulnerable populations, and the local agencies and private utilities serving them, to participate in statewide, regional, and local water planning processes and to get equal access to State funding for water projects.

Ensuring Sustainable Water Uses

To ensure that our water uses are sustainable, water management at all levels—State, federal, regional, and local—must be based on three foundational actions:

- Use water efficiently
- Protect water quality
- Support environmental stewardship

A number of resource management strategies that can be used to accomplish the foundational actions are listed in the following sections and described in more detail in Volume 2 Resource Management Strategies.

Use Water Efficiently

To minimize the impacts of water management on California's natural environment and ensure that our state continues to have the water supplies it needs, Californians must use water efficiently to get maximum utility from existing supplies. Californians are already leaders in water use efficiency measures such as conservation and recycling. Because competition for California's limited water resources is growing, we must continue these efforts and be innovative in our pursuit of efficiency. Water use efficiency will continue to be a primary way that we meet increased demand.

In the future, we must broaden our definition of efficient water use to include other ways of getting the most utility out of our groundwater and surface water resources and water management systems:

- Increase levels of urban and agricultural water use efficiency
- Increase recycled municipal water and expand its uses
- Reoperate water facilities to improve their operation and efficiency
- Facilitate environmentally, economically, and socially sound transfers to avoid regional shortages
- Reduce and eliminate groundwater overdraft

As California's population grows from 36.5 million to a projected 48 million in 2030, there is bound to be an effect on California's environment. By wringing every bit of utility from every drop of water, Californians can stretch water supplies and help ensure continued economic and environmental health.

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Water supply and water quality are inseparable in water management.

Protect Water Quality

California must also protect and improve water quality to safeguard public and environmental health and secure the state's water supplies for their intended uses. Water supply and water quality are inseparable in water management. While implementing projects to reduce water demand or to augment supply, water managers must employ methods and strategies that protect and improve water quality:

- Protect surface waters and aquifers from contamination
- Explore new treatment technologies for drinking water and groundwater remediation
- Match water quality to its intended uses
- Improve management of urban and agricultural runoff
- Improve watershed management

Support Environmental Stewardship

To ensure sustainability, California must also manage water in ways that protect and restore the environment. Water is a vital natural resource for people and the environment, so water management activities must occur in the context of resource management and environmental protection. Water development in California has a rich history of conflict, at times pitting water supply projects against ecosystem protection. Water supplies and the environment must be considered together.

Water management activities will often have unavoidable environmental consequences: When water is removed from the natural environment for other beneficial uses, the environment is affected. In carrying out water management activities, Californians must acknowledge these environmental costs and ensure that restoration actions are carried out to maintain and improve environmental health.

Water managers must support environmental stewardship as part of their management responsibilities. As managers develop and deliver reliable water supplies, environmental stewardship can be incorporated in many ways:

- Integrate ecosystem restoration with water planning and land use planning

- Restore and maintain the structure and function of aquatic ecosystems
- Assist in the recovery of aquatic and riparian species listed in the federal and State Endangered Species Act.
- Minimize the alteration of ecosystems by water management actions
- Improve watershed management
- Protect public trust resources (See Box 2-2)
- Integrate flood management with water supply management

Ensuring Reliable Water Supplies

Two key initiatives in California Water Plan Update 2005 outline ways to ensure that Californians have reliable water supplies—enough clean and affordable water supplies for homes, industry, business, and agriculture through the year 2030. These initiatives must be based on three foundational actions—use water efficiently, protect water quality, and support environmental stewardship. As part of the Framework for Action, State, federal, regional, and local agencies and governments must work cooperatively on these two critical initiatives:

1. Promote and practice integrated regional water management
2. Maintain and improve statewide water management systems

The following sections describe each initiative, outline State government's role in promoting them, and identify specific actions that should be completed before the next water plan update.

Initiative 1 Promote and Practice Integrated Regional Water Management

Promote integrated regional water management to ensure sustainable water uses, reliable water supplies, better water quality, environmental stewardship, efficient urban development, protection of agriculture, and a strong economy.

The first initiative is to continue recent progress in implementing integrated regional water management. This is an approach that will help communities and regions incorporate sustainable actions into their water management efforts. Integrated regional programs will be most successful in providing reliable water supplies when they use water efficiently, protect water quality, and restore the environment.

This initiative includes the following elements:

- Foster regional partnerships
- Develop and implement integrated regional water management plans
- Diversify regional water portfolios

Over the past 50 years, California has met much of its increasing water demands with interregional projects. Although these State, federal, and local projects now serve as the backbone of California water management, by themselves they cannot provide for our growing population, changing agricultural production patterns, and environmental needs. However, regional partnerships can efficiently solve water management problems, consider multiple resource issues, and account for the distinct regional hydrology, infrastructure, and political institutions.

With State government leadership, assistance and oversight, regional water planning and management will help meet water needs through 2030. Integrated regional water management relies on a diversified portfolio of water strategies. The resulting regional plans can provide efficient solutions, consider other resource issues, and enjoy broad public support.

Foster Regional Partnerships

The physical and institutional realities within California do not allow for a one-size-fits-all approach to water management and planning. The California Water Plan serves as a critical tool for coordinating water planning and management throughout the state, but integrated resource planning must be applied on a regional level to develop integrated regional water management plans that contain the mix of resource management strategies best suited for each region's particular conditions and goals.

Regions have opportunities not available to individual water suppliers. Water suppliers that form partnerships with other entities in their region can accomplish projects and provide benefits that no single agency could do alone. For example, partnerships may allow agencies to improve their water supply reliability by establishing emergency connections with neighboring water suppliers; increase operational flexibility by participating in regional groundwater management and conjunctive use; protect water quality by participating in regional watershed management; reduce costs by cooperating with other agencies on water conservation and outreach programs; facilitate new projects by contributing to local habitat conservation plans; and help achieve many other regional resource management objectives.

Water management activities must occur in the context of resource management and environmental protection.

Box 2-2 Public Trust Responsibilities of State Agencies

The Public Trust Doctrine imposes trust responsibilities on State agencies that have authority over trust resources (certain types of property of high public value held for the benefit of all citizens) or whose activities might affect the resources. Examples of these responsibilities include the following:

The Department of Fish and Game, under Fish and Game Code section 1802, must exercise its responsibilities as trustee for the resources of the State with jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. DFG acts as a permitting agency for streambed alteration permits, reviews and comments on environmental documents, participates in water rights hearings to present evidence regarding the needs of fish and wildlife, determines instream flow requirements of certain streams, implements and enforces the California Endangered Species Act and the Natural Community Conservation Planning Act.

The Department of Water Resources must consider the public trust in connection with the planning, design, construction, and operation of State Water Project (SWP) facilities or other projects in which DWR is a participant. Where a project will require a new water rights permit, the State Water Resources Control Board will usually make a public trust determination during the course of the water rights process. DWR should assist SWRCB by conducting and presenting studies and investigations regarding the needs of trust resources. Fish and Game Code section 5937 requires all dam owners to release or bypass sufficient water to keep fish in the stream below the dam in good condition.

When acting as a party to a transfer, or when approving use of SWP facilities by others, DWR must take the public trust into account. Where SWRCB approval of a transfer is required, SWRCB may take the lead in determining what is required to protect the public trust resources. Where SWRCB approval is not required, as in the case of transfers of pre-1914 rights, DWR should consider all available information and protect public trust uses whenever feasible and reasonable. DWR may put conditions on its participation in a transfer, or condition the use of SWP facilities to protect public trust uses or resources. If a transfer would cause undue harm to trust resources, DWR may decline to participate, or deny the use of SWP facilities.

DWR also has the obligation to consider the public trust when carrying out its role in water planning, including the preparation of this water plan.

The State Lands Commission, which holds and administers state sovereign lands, including tidelands and the beds of navigable streams, must protect the public's interest in trust uses of those properties.

The State Water Resources Control Board must consider the public trust when granting water rights permits or licenses or approving transfers or other change petitions. SWRCB may fulfill its duty of continuous supervision under the Public Trust Doctrine by responding to complaints of violation or initiating investigations. If it determines that the trust is being violated, it may reconsider and amend existing water rights.

In acting on permits, transfer petitions, or complaints, SWRCB considers all available information, including NEPA or CEQA documents, input from DFG, information or evidence presented by other State agencies or local agencies or other parties, and other evidence regarding appropriate instream flows and non-flow conditions necessary to protect trust resources. The balance between the need to use water out of the stream and the requirement to protect trust uses will vary with the circumstances of the particular diversion. Trust resources must be protected where feasible.

Regions may require intergovernmental cooperation to reduce controversy over distribution and use of water. For example, the Klamath River Compact Commission, created by the 1957 Klamath River Compact, is a cooperative relationship between the states of Oregon and California and the US Bureau of Reclamation. The commission promotes the orderly, integrated, and comprehensive development, use, conservation and control of water for irrigation, protection of fish and wildlife, domestic and industrial use, hydropower, navigation, and flood protection.

Partnerships can lead to integrated regional water management plans and regional eligibility for certain grant funds. Integrated regional water management relies on a diversified portfolio of water strategies. Early coordination with land planning agencies may help water suppliers and land planners anticipate and plan for future growth, and ensure that additional regional growth will not exceed water suppliers' capabilities. Ultimately, regional partnerships will enable optimum management of water and other resources within a

region, and the resulting regional plans can provide efficient solutions, consider other resource issues, and enjoy broad public support.

Develop and Implement Integrated Regional Water Management Plans

To quote the great American naturalist John Muir, "When we try to pick out anything by itself, we find it hitched to everything else in the Universe." This concept is the premise of integrated resource planning, the basis for integrated regional water management (see Box 2-3 Integrated Resource Planning, the Basis for Regional Water Management). The approach requires that we become better systems thinkers and take into account how resource management practices and land use changes affect the long-term reliability and quality of water supplies. Our perspective should be broad—include economic growth, environmental quality, and social equity. Given the projected population increases and strain that new development can impose on ecosystems, an integrated, regional approach throughout California

Box 2-3 Integrated Resource Planning, the Basis for Regional Water Management

Overview

Integrated resource planning is a comprehensive approach to resource management and planning that emerged in the late 1980s in the electric power industry. As applied to water management, integrated resource planning is a systems approach that explores the cause-and-effect relationships affecting water resources wherever the planning entity's operations affect water use, quality, and supply. The process analyzes all the interrelated water management components in a given region. The focus is on the interrelation of the different water management components with the understanding that changes in the management of one component will affect the others. Because these components are often not confined to the boundaries of a single water management agency, a consensus-based, cross-jurisdictional, regional approach may be required to formulate comprehensive, win-win solutions to identified problems.

The overriding goals of the process are to ensure reliable, affordable, good quality water from a diversity of sources; and design a comprehensive plan that achieves water supply reliability and quality objectives but allows planned programs to adapt to changes in environmental, institutional, and socioeconomic conditions. By its nature, integrated resource planning is technical and political because a plan for managing water resources in any basin affects ecosystems; socioeconomic systems; and water storage, treatment, and conveyance systems. Integrated resource planning identifies the appropriate mix of demand-side and supply-side management components (for example, urban water conservation, agricultural water conservation, water reuse and recycling, water transfers, conjunctive use, expanded conveyance flexibility, and new groundwater and surface water storage) that are expected to provide long-term, reliable water service and maximize benefits at the lowest reasonable cost. The process is employed to:

- evaluate the current state of water resources in a watershed or region;
- determine the variety of current and future demands for water and how demand, quality, and supply patterns are affecting land use, fish and wildlife resources, and local and regional economies; and
- balance demand management and supply enhancement options to produce a comprehensive, adaptive water management plan that specifies long-term goals, objectives, and programs to provide sustainable water uses in a basin.

continued

is the best approach to protect the environment and manage urban growth. California must implement integrated regional water management to ensure reliable water supplies, environmental stewardship, and efficient urban development. (See Box 2-4 Elements of Integrated Regional Water Management).

California is placing more emphasis on integrated regional water management. With this inclusive systems approach, local agencies and governments can be more flexible and act more efficiently. This approach makes better use of existing local resources. It integrates multiple aspects of managing water and related resources such as water quality, local and imported water supplies, watershed protection, wastewater treatment and recycling, and protection of local ecosystems.

With State government leadership, assistance and oversight, regional water planning and management will help meet water needs through 2030.

The principles of integrated regional water management have a broad and long-term perspective. By applying the principles, regions develop plans that have multiple benefits. As an example, in some areas of the state, agricultural users have developed projects that simultaneously conserve water, reduce contaminants, preserve the agricultural economy, and improve aquatic habitat.

State government must help cities, counties, local water agencies, and private utilities to prepare useful integrated regional water management plans. State government should develop incentives to promote and support integrated regional water management. With the State's technical assistance and partnership, local and regional agencies and governments can apply balanced portfolios of water resource management strategies to help meet their water demands, and put into effect existing legislation and State policies that improve coordination between water and land use planning.

Box 2-3 continued from previous page

When integrated resource planning is applied rigorously, it considers all competing needs and identifies the different resource management strategies that the planning entity can employ (See Volume 2 for a discussion of 25 resource management strategies). Integrated resource planning evaluates various response packages, which are different mixes of resource management strategies used to manage water resources over a designated planning horizon, and indicates when and under what future conditions a management strategy would be added or changed. The costs (socioeconomic and environmental) of employing each response package are also derived during the planning process.

Selecting the timing of adding or changing individual strategies to a region's management response requires completion of a risk analysis. The risk analysis takes into account the expected frequency and severity of not meeting current and future water demands; how additional water management strategies are likely to affect that frequency and severity; and how available contingency measures can reduce the impact of shortages when they occur.

Integrated resource planning includes many elements of traditional planning. It also includes thorough analyses of water use efficiency programs, levels of uncertainty acceptable to the planning entity, and coordinated efforts to involve the public in the planning process. Integrated resource planning is multi-objective planning that recognizes decisions must balance competing objectives in a sustainable way. Integrated resource planning often includes the following activities:

- Define planning objectives and associated evaluation criteria (see Chapter 4 for suggested criteria). The objectives must be specific and the criteria measurable, so they can be used to evaluate alternative response packages.
- Involve the appropriate constituencies. The level and breadth of involvement will vary depending on local area needs and the level of interest in the resource strategies being considered.
- Assess demand-reduction strategies such as agricultural and urban water conservation. These strategies must be identified and analyzed in the same multi-tiered way that supply-side strategies are analyzed.
- Assess operational efficiency and supply redistribution strategies such as conveyance, system operation, and water transfers.

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Box 2-3 continued from previous page

- Assess supply augmentation strategies such as conjunctive management, water recycling, desalination, and storage.
- Assess water quality management strategies such as drinking water treatment, groundwater/aquifer remediation, pollution prevention, and runoff management.
- Assess resource stewardship strategies such as agricultural land stewardship, urban land use management, ecosystem restoration, floodplain management, and watershed management.
- Formulate and evaluate different response packages. The resource management strategies selected from the above activities are combined into alternative response packages (25 strategies are described in Volume 2). Each response package then goes through multilevel screening using approved evaluation criteria, until (one to three) responses emerge that best meet the planning objectives and evaluation criteria. Each response package (mix of strategies) must explicitly demonstrate the tradeoffs among the different evaluation criteria. Often, a decision analysis method must be approved before screening the individual resource management strategies and the response packages.

Guiding Principles

Use a broad, long-term perspective. Use a comprehensive stakeholder-based planning process to (1) promote multi-objective planning with a regional focus, (2) emphasize both local and regional initiatives, (3) recognize distinct regional problems and resources, and (4) emphasize long-term planning (30-50 year planning horizon).

Identify broad benefits, costs, and tradeoffs. Evaluate programs and projects recognizing economic growth, environmental quality, and social equity as co-equal objectives. Based on this comprehensive assessment, determine potential economic, environmental, and social benefits, beneficiaries, costs, and tradeoffs and include a plan to avoid, minimize, and mitigate for adverse impacts.

Promote sustainable resource management. Promote the wise use of all natural resources to ensure their availability for future generations. This can be done by promoting activities with the greatest benefit for the entire region and activities that consider the interrelationship between regional water supplies, water quality, water infrastructure, flood protection, recreation, land use, economic prosperity, and the environment.

Increase regional self-sufficiency. Increase regional self-sufficiency by considering activities that reduce the need to import water from another hydrologic region, particularly during times of limited supply availability such as during a drought or after a catastrophic event like an earthquake.

Increase regional drought preparedness. Evaluate and implement strategies that among other benefits would reduce the impacts of drought in the region. In California, drought contingency planning is an important component of regional water planning. Examples of such strategies include water use efficiency and recycled municipal water, system reoperation, conjunctive management and groundwater storage, surface storage (CALFED and regional), and ocean and brackish water desalination.

Promote environmental justice. All projects sponsored by or partnered with the State, or using public funds must promote environmental justice, which is the fair treatment of people of all races, cultures, and incomes with respect to the development, funding and implementation of resource management projects.

Promote coordination and collaboration among local agencies and governments. Promote and improve coordination and collaboration among local agencies and governments within a region, particularly those that are involved in activities that might affect the long-term sustainability of water supply and water quality within the region. Regional planning should include a public review process with open and transparent decision-making, as well as education and outreach for public, stakeholders, and decision-makers.

Use sound science, best data, and local knowledge. Use the best available data and information and, when possible, use planning methods and analytical techniques that have undergone scientific review.

Box 2-4 Elements of Integrated Regional Water Management

A water management plan created through integrated resource planning includes the following elements:

Content and Principles

- Short-term goals and objectives (prioritized to the extent possible)
- Long-term goals and objectives (prioritized to the extent possible)
- Description of current resource characteristics and conditions
- Description of resource management strategies to address cross-cutting water management issues such as flood control, water quality, environmental water management, land use planning, water allocation and appropriation
- Inclusion of information from a variety of interests through broad public participation—especially when developing goals, objectives, and evaluation criteria
- Information regarding management strategies, costs, risks and tradeoffs (more details offered under “Analysis” below)
- Transparency of evaluation methods, tools, assumptions, and data

Analysis

- Initial conditions for water management information such as water uses, supplies, quality, water infrastructure and operational criteria, and water-related resource management
- Employment of a systems approach to water management assessment
- Current water management objectives
- Current water management capabilities, such as ability to meet current water management objectives
- Employment of a least-cost planning framework¹ that identifies all economic costs and other implications of adding reliability, as well as all costs and implications of forgoing additional reliability
- Identification of risks and uncertainties associated with different resource management strategies
- Evaluation criteria for comparing alternative response packages (different mixes of management strategies)
- Identification of response packages that achieve an acceptable level of supply reliability and meet other water management objectives, while considering risks and tradeoffs.

Implementation

- Finance plan based on prioritized objectives and preferred response packages
- Implementation plan that includes roles, tasks, and challenges, such as regulatory compliance, lead agencies, timelines, legal issues, etc.
- Performance measures to track plan implementation (for example, how well the preferred response packages meet goals and objectives)
- Data collection and management needed to evaluate performance of regional programs and projects

¹ Least-cost planning is a cornerstone of integrated resource planning. It assists a comprehensive examination of all water management alternatives including the option of forgoing additional reliability measures if the cost (economic or other) of implementation exceeds the cost of coping with current reliability levels.

Diversify Regional Water Portfolios

Every region of California must build a diverse water portfolio that balances cost-effective water supplies and demands while protecting the environment. The foundational actions, which are necessary for sustainable water uses and reliable water supplies, must guide how a region balances its water portfolio—for example, increasing water use efficiency while maximizing the return on investment in sound water management policies. Every time water is wasted, money and a precious resource go down the drain. Continued investment in our existing facilities and carefully planned new water developments will provide the strong foundation to meet future needs. But Californians also must promote water conservation and recycling, enhance groundwater storage, provide adequate supplies of water for the environment, and support innovative water technologies such as desalination to reduce the impacts of droughts, support a vibrant economy, and meet future water demands for all beneficial uses.

California's regions cannot meet all of their water objectives with a single strategy. Volume 2 of this water plan update describes 25 resource management strategies. These strategies are like individual tools in a tool kit. Just as the mix of tools will vary depending on the job, the combination of strategies will vary from region to region depending on the individual situations surrounding water supply and use, climate, projected growth, and environmental and social conditions. A diverse portfolio of water management strategies is essential to provide the flexibility needed to cope with changing and uncertain future conditions.

Near-term Actions to Implement Initiative 1

State government is responsible for ensuring that regional projects and initiatives protect the public trust and the environment, evaluating the interaction of water supply between regions, and evaluating the adequacy of statewide water supplies for all beneficial uses. To ensure that state water planning and future decisions about water use and urban development are in line with the State's sustainable development goals, State and local governments and agencies should carry out the following near-term actions:

- Regional efforts should incorporate integrated water management to meet multiple water management objectives consistent with the principles advanced in this water plan.

- The degree and nature of the need for more ground water and surface water storage varies from region to region; therefore, DWR will work with regional entities to evaluate the best ways to meet their ground water and surface storage needs and the possible means of sharing storage capacity among regions.
- Local governments and agencies should improve coordination between land use planning and water planning and management to ensure that new infrastructure has adequate water supply and that land uses are protective of water quality.
- State government should give preference to applicants of Proposition 50, Chapter 8 grants¹ who have plans that apply DWR and State Water Resource Control Board (SWRCB) grant program guidelines².
- DWR will adapt its existing programs and develop new ones to give incentives and technical assistance to regional and local agencies and governments to prepare comprehensive, integrated water management plans that include actions to protect public trust resources and promote efficient, beneficial water use.
- DWR will develop guidelines for technical and financial assistance and templates for integrated regional water management plans, urban and agricultural water management plans, and drought contingency plans.
- DWR will facilitate the next phases of this water plan update, use the water plan update process as a forum to identify and resolve conflicts between regional plans, and integrate the water plan into a future State strategic planning process.

Regional partnerships will enable optimum management of water and other resources within a region.

California's regions cannot meet all of their water objectives with a single strategy. Just as the mix of tools will vary depending on the job, the combination of strategies will vary from region to region.

¹ Proposition 50: Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002, Chapter 8 "Integrated Regional Water Management."

² DWR and SWRCB. 2004. Integrated Regional Water Management Grant Program Guidelines: Proposition 50, Chapter 8. Nov

www.grantsloans.water.ca.gov/grants/integregio.cfm

Initiative 2 Maintain and Improve Statewide Water Management Systems

Maintain and improve statewide water management systems to provide reliable water supplies, improve drought and flood management, and sustain the Sacramento-San Joaquin Delta.

The second initiative for ensuring reliable water supplies is to maintain and improve statewide water management systems. California depends on vast statewide water management systems to provide clean and reliable water supplies, protect lives and property from flood, withstand drought, and sustain environmental values. These water management systems include physical facilities and statewide water management programs.

Facilities - the backbone of water management in California – include over 1,200 State, federal, and local reservoirs, as well as canals, treatment plants, and levees. Systems are often interconnected. The operation of one system can depend on the smooth operation of another. The successful operation of the complete system can be vulnerable if any parts fail.

This initiative also includes statewide water management programs, which contribute to better operation of water systems. These programs include water quality standards, monitoring programs, economic incentives, water pricing policies, and statewide water efficiency programs such as appliance standards, labeling, and education. These statewide water management programs help meet major State government responsibilities for statewide water planning and ecosystem restoration. The State needs to continue providing technical assistance to efforts involving interregional, interstate, or international issues, and to efforts resulting in broad public benefits, such as protecting and restoring the Sacramento-San Joaquin River system and Delta, Salton Sea, Mono Lake, Klamath basin, and Lake Tahoe.

This initiative includes the following actions by State, federal, and local agencies and governments. Their success depends on the concurrent implementation of three foundational actions—use water efficiently, protect water quality, and support environmental stewardship.

- Improve aging facilities
- Implement the CALFED Program
- Improve flood management
- Sustain the Sacramento-San Joaquin Delta

These water management systems include physical facilities and statewide water management programs.

Improve Aging Facilities

California must rehabilitate and improve its aging water facilities, especially those that provide drinking water, sewage treatment, water delivery, and flood control. These are operated by State, federal, and local entities. Aging facilities risk public safety, water supply reliability, and water quality. The State Water Project is over 30 years old; the federal Central Valley Project is over 50 years old. Some local facilities were constructed nearly a century ago. These and other aging facilities must be carefully maintained, rehabilitated, and improved to protect public investment and ensure that our water management systems continue to provide intended services.

The maintenance and rehabilitation of California's water facilities as they age will be costly. In addition, these facilities will face many challenges, such as changing water demands and use patterns, withstanding catastrophic natural events like earthquakes and floods, and adapting to the potential impacts of global climate change.

By maintaining, rehabilitating, and improving our water facilities, we enhance the efficiency and flexibility of our water management systems. Improvements may include new water storage, additional conveyance capacity, and refinements in the way water systems are operated. These improvements are intended to increase reliability and flexibility in the system, improving our ability to deal with the uncertainty of a highly variable water supply.

Implement the CALFED Program

The CALFED Bay-Delta Program is intended to develop and implement a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Delta System. The program significantly reduced conflicts over Delta operations through better agency coordination and implementation of comprehensive resource management solutions.

California must rehabilitate and improve its aging water facilities, especially those that provide drinking water, sewage treatment, water delivery, and flood control.

Box 2-5 CALFED Bay-Delta Program

The San Francisco Bay-Sacramento-San Joaquin River Delta is one of California's unique and valuable resources. The Bay-Delta system provides drinking water for 22 million people and is an integral part of California's water system. It supports California's trillion dollar economy, including its \$28 billion agricultural industry. Its levees protect farms, homes and infrastructure. It is the largest estuary on the West Coast and is home to 750 plant and animal species. The Bay-Delta supports 80 percent of the state's commercial salmon fisheries.

The Bay-Delta has been in decline for decades. Growth and development in California have increased demands on the Bay-Delta for water supply. At the same time, the health of the Bay-Delta ecosystem has deteriorated and populations of important fish species are at risk.

The CALFED Bay-Delta Program is a collaborative effort among 25 state and federal agencies to improve water supplies in California and the health of the San Francisco Bay-Sacramento-San Joaquin River Delta Watershed. In 2000, the agencies drafted a 30-year plan described in the CALFED Record of Decision. The plan sets general goals and describes a science-based planning process through which the agencies can make better, more informed decisions on future projects and programs within their jurisdictions.

The CALFED agencies working with local partners are implementing hundreds of projects to improve the quality and reliability of the Bay-Delta system. As a result, conflict in the Delta has been reduced. Water supplies are becoming more reliable, water quality issues are gaining the attention they deserve, and the Bay-Delta environment is showing some favorable responses.

The mission of the CALFED Bay-Delta Program is to develop and implement a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Delta System. The program's four objectives are water supply reliability, water quality, ecosystem restoration, and levee system integrity. The objectives are being achieved through implementation of 11 major program elements:

- Conveyance
- Drinking Water Quality
- Ecosystem Restoration
- Environmental Water Account
- Levee System Integrity
- Science
- Storage
- Water Management
- Water Transfers
- Water Use Efficiency
- Watershed Management

continued

Box 2-5 continued from previous page

The following is a summary of the major components of the four CALFED objectives:

Water Supply Reliability

- Assist local partners in developing 500,000 to 1 million acre-feet of groundwater storage.
- Pursue planning and other actions at state and federal levels to expand surface storage capacity by up to 3.5 million acre-feet.
- Optimize water conveyance facilities in the Delta and in other locations to maximize operational flexibility, protect water quality and fish species, and increase water supply reliability.
- Invest in local projects that boost water use efficiency through annual water conservation and recycling competitive grants and loan program.
- Streamline the water transfer approval process and develop an effective water transfer market that protects water rights, the environment and local economies.

Water Quality

- Develop and implement source control and drainage management programs.
- Invest in treatment technology.
- Implement aggressive measures to improve Delta water quality and water quality science.
- Improve or maintain water and sediment quality to support healthy and diverse aquatic ecosystems and to the extent possible, eliminate toxic impacts to aquatic organisms, wildlife and humans.
- Improve dissolved oxygen conditions in the San Joaquin River near the Port of Stockton as part of ecosystem restoration efforts.

Ecosystem Restoration

- Conduct a grant program to fund local projects in habitat restoration, fish passage, invasive species management and environmental water quality.
- Recover at-risk native species and their habitats.
- Augment stream flow in upstream areas to benefit native fish and invest in fish passage improvements through dam removal and improved fish ladders.
- Provide local and technical assistance to assess watershed conditions and develop plans to address watershed problems.
- Manage the Environmental Water Account to acquire water from willing sellers to protect fish species without reducing water supply reliability.
- Conduct an annual science review to assess effectiveness.
- Develop opportunities for working farms and ranches to contribute to ecosystem restoration objectives.

Levee System Integrity

- Maintain and strengthen Delta levees, provide protection and enhancement of Delta habitats and drinking water quality.
- Develop best management practices for beneficial reuse of dredged material.
- Improve the Delta Emergency Management Plan and develop a Risk Management Strategy to identify risks to Delta levees, evaluate consequences and recommend actions.

See also CALFED Web site at www.calwater.ca.gov

The CALFED program proposes actions to improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta, reduce the mismatch between Bay-Delta water supplies and current and projected beneficial uses, provide good water quality for all beneficial uses, and reduce risks from catastrophic breaching of Delta levees. See Box 2-5 CALFED Bay-Delta Program.

State government must provide leadership to revitalize the CALFED Bay-Delta Program. This will continue our progress toward meeting CALFED objectives of improved water supply reliability, good water quality, ecosystem restoration, and levee system integrity.

Consistent with the commitment in the Governor's budget, **a three-point plan has been developed that will allow the CALFED Program to move forward** and focus on addressing the highest priority issues associated with the conflicts of the Delta. To be completed by December 2005, the plan includes:

- An Independent Review and fiscal review of the CALFED Program to ensure accountability, highlight accomplishments, determine program status, and guide adjustments to the Program.
- A public process to refocus the efforts of the California Bay-Delta Authority and the other CALFED State agencies on solving conflicts associated with Delta water supply, water quality levee stability, and the environment.
- A 10-year action plan for financing to be developed in coordination with stakeholders and our federal partners that will focus on solving the highest priority Delta issues.

Improve Flood Management

The need for adequate flood management is more critical now than ever before. While the flood protection system—constructed over the past 100 years—continues to age, budget shortfalls have meant the deferral of maintenance. In addition, new knowledge of levee instability factors, changing rainfall patterns, and increased development in floodplains has combined with the above trends to put the State's financial stability and the safety of its people at risk. California needs aggressive investment in the State's flood management system and a change in the way we think about flood management.

Compounding these challenges are recent court rulings. Appellate court decisions have exposed the State and local agencies to enormous liability for failing to investigate the

condition of flood control facilities that were made a part of a larger system, and for failing to challenge environmental constraints on maintenance activities.

It has become clear that a new approach to flood management is needed. Flood management in the Central Valley needs an approach that will achieve both short-term and long-term solutions. This approach should include a set of strategies that involve policy changes, program reforms, and funding proposals to better protect California from the devastating consequences and economic impacts caused by floods. These strategies include: improved maintenance, system rehabilitation, removal of structures from some flood-prone areas, and restoration of ecological/geomorphological/hydrological functions, better emergency response, sustainable funding for flood management programs, better flood mapping, and public education. Legislative and constitutional actions may include stronger flood insurance requirements, a Central Valley flood control assessment district, or a reduction in taxpayer exposure for funding flood disaster claims. These actions will ensure that people who choose to live or work in floodplains are aware of the hazards, pay for flood protection systems, and bear the consequences of floods.

Flood management cannot occur in isolation; whenever possible it must be a part of multi-objective management of floodplains, integrated with other objectives such as ecosystem restoration and farmland protection. For example, the priorities of the CALFED Bay-Delta Program Ecosystem Restoration Program include restoration of floodplain habitat, riparian corridors, and dynamic river processes such as river meandering. The ERP identifies ways to copy natural flows using reservoir releases; copy natural flows of sediment and woody debris; and provide enough high flows to cover floodplains. The program recognizes that reconnection of rivers with their floodplains may be essential for recovering many at-risk species.

Sustain the Sacramento-San Joaquin Delta

The Sacramento-San Joaquin Delta is the hub of California water management and a vital aquatic ecosystem. Public and private entities carry out myriad activities to maintain the benefits that California derives from this great estuary: the State Water Resources Control Board sets water quality standards; the State Water Project and Central Valley Project operate to meet these standards; federal, State, and private entities preserve land as habitat; farmers till 500,000 productive acres.

The common denominator among all these pursuits is the Delta levee system. These levees protect water supplies needed for the environment, agriculture, and urban uses. Delta levees also protect roadways, cities, towns, agricultural lands, as well as terrestrial and aquatic habitat. The CALFED Levee System Integrity Program Element was established to help protect the Sacramento-San Joaquin River Delta from flooding and the Delta's ecosystem and water supply functions from damage and disruption due to levee failure. **DWR is working with other agencies to develop the Delta Risk Management Strategy.** Development of the DRMS includes an assessment of levee failure risks; a detailed analysis of the consequences of levee failure, including water supply, environmental, and economic impacts; and the development of a strategic plan to reduce risks, as described in Box 2-6 Delta Risk Management Strategy.

Despite their importance, there are many factors that make it quite challenging to sustain the Delta levees and the benefits they protect.

- Subsidence of Delta islands continues to occur where peat soils oxidize, increasing the pressure on levees that protect the islands.
- A catastrophic earthquake in or near the Delta might cause multiple levee failures that would draw seawater into the Delta, rendering the water unfit for irrigation or human consumption until levees were repaired and seawater was flushed from the Delta.
- Climate change is causing sea levels to rise and may also increase the magnitude of floodflows.
- Maintenance and improvement of Delta levees is costly, and available funds have not kept pace with needs.
- Levee failures are extremely costly to repair, further burdening the ability to fund adequate maintenance and rehabilitation.

Box 2-6 Delta Risk Management Strategy

The Sacramento-San Joaquin Delta is susceptible to catastrophic damage according to various possible levee failure scenarios. Among many possible consequences, levee failure in the Delta could result in the loss of human life, irreparable harm to the Delta's fragile ecosystem and its listed and endangered species, temporary or long-term disruption of the water supply for about two-thirds of the state's residents and much of its agriculture, and economic losses in the billions of dollars.

The Department of Water Resources and the U.S. Army Corps of Engineers, in conjunction with the California Department of Fish and Game, are developing the Delta Risk Management Strategy. Development of the DRMS will require an intensive multiyear effort for:

- evaluation of the ongoing and future probability of levee failure due to a variety of possible causes over the next 50 years;
- identification and assessment of the probable physical and related economic consequences of levee failure, including the loss or impairment of human life, property, public infrastructure, water supply operations, ecosystems, agriculture, recreation and navigation;
- identification and evaluation of actions that can be taken to reduce the probability and consequence of levee failure;
- setting of both short-term and long-term priorities for reducing the probability and impact of levee failure; and,
- development of an action plan to include alternate risk reduction strategies for the Delta.

Development of the DRMS is consistent with the 2000 CALFED Record of Decision Preferred Action Alternative which describes actions, studies, and conditional decisions necessary for preserving and improving the Delta. Development efforts will include a public and stakeholder involvement process.

Additional information concerning the development of the DRMS can be obtained from the Department of Water Resources' Division of Flood Management.

The Sacramento-San Joaquin Delta, like the Central Valley flood control system, needs a comprehensive, long-term vision and plan that will achieve both short-term and long-term solutions. This approach should maintain the services and values we get from the Delta and should be sustainable over the long term.

Near-term Actions to Implement Initiative 2

In addition to maintaining and improving statewide water management systems, we must use water and operate facilities more efficiently in all regions of the State. Water conservation must play a key role in this process because conservation practices increase efficiencies, are generally cost-effective, and reduce overall demands on facilities. Increasing operational flexibility will also be important, especially with the SWP and CVP. Projects that increase operational flexibility, such as the SWP-CVP intertie planned as part of the Delta Improvements Package, can provide water managers with a wider range of options to meet water supply reliability needs (see Box 2-7 Delta Improvements Package). During critically dry periods, a Water Transfers Dry Year Program³ similar to earlier programs could also add flexibility and help optimize water infrastructure operations.

As efficiency increases and water is made available for longer-term use, additional groundwater and surface water storage will be needed in some regions for operational flexibility. However,

some regions may not need to invest in more storage facilities because existing storage capacities and available water supplies vary from region to region. Water storage needs should be considered from a more local perspective in integrated regional water management plans to more accurately account for regional conditions.

Improvements for more efficiency and flexibility in statewide water management systems include new, suitably located physical facilities, operational commitments, and special water transfer programs.

- DWR, in cooperation with the California Bay-Delta Authority (CBDA) and CALFED implementing agencies, will implement actions in the CALFED Record of Decision, namely the Delta Improvements Package and other CALFED programs, including the Ecosystem Restoration, Water Quality, Levees, and Water Use Efficiency programs, its Science Program and the Interagency Ecological Program.
- DWR will develop and carry out a comprehensive flood management plan. DWR has prepared a White Paper that addresses the need for an aggressive investment in the State's flood management system (DWR 2005).

Box 2-7 Delta Improvements Package

The Delta Improvements Package outlines actions related to water project operations in the Sacramento-San Joaquin Delta that will result in increased water supply reliability, improved water quality, environmental protection and ecosystem restoration, protection of the Delta Levee system, and analyses and evaluation to support improved real-time and long-term management.

It also outlines conditions under which the State Water Project would be allowed to increase its permitted export pumping capacity from 6,680 to 8,500 cubic feet per second. In addition to the commitments in the CALFED Record of Decision to avoid adverse fishery impacts and to protect in-Delta water supply reliability and water quality, these conditions include the following:

- Construction of permanent operable gates in the South Delta
- Development of a salinity management plan for the San Joaquin River
- Improvements to protect water quality near the Contra Costa Canal
- Environmental protection for important native fish species, including implementation of the Ecosystem Restoration Program
- Development of a long-term Environmental Water Account

See Volume 3, Chapter 12 "Sacramento-San Joaquin Delta Region" for discussion of some package components.

More on Web site at: <http://www.calwater.ca.gov/DeltaImprovements/DIP/DeltaImprovementPackage.shtml#CURRENT>

³ http://www.watertransfers.water.ca.gov/water_pgms/water_pgms_index.cfm

- DWR and the U.S. Army Corps of Engineers, in conjunction with the California Department of Fish and Game, will prepare the Delta Risk Management Strategy to evaluate the probability of Delta levee failures in the next 50 years, estimate the impacts and economic consequences from levee failures, propose actions to reduce the probability of levee failures and their consequences, and develop a strategic action plan with alternative strategies to reduce risk for the Delta.
- DWR, in cooperation with the regional partners, will complete feasibility studies of additional surface storage in the CALFED Record of Decision. California should pursue projects that have regional support and viable financing plans.
- DWR will help resolve long-standing water quality issues in the state, such as Delta salinity, dissolved oxygen in the San Joaquin River near Stockton, salinity at Vernalis, and ecosystem restoration flow needs, extending from the Klamath River in the north to Salton Sea in the south.
- DWR will develop and administer a Dry Year Water Transfer Program when needed to meet critical water needs during shortages while protecting regions with available supplies.
- DWR, in cooperation with the CBDA and other State and federal agencies, will continue to evaluate and, if feasible, implement a long-term Environmental Water Account.
- DWR and State agencies should advance water planning and management that restore and protect watersheds and assess instream flow demands needed to protect and restore aquatic ecosystems.
- CBDA works with CALFED agencies to develop a comprehensive list of tasks being conducted under the CALFED Bay-Delta Program, to prioritize the tasks in cooperation with the CBDA public advisory committee, to develop a schedule for completing the tasks, and to estimate funding necessary to continue work.

Performing Essential Support Activities

Critical parts of the Framework for Action are the foundational actions needed for sustainable water uses and the two initiatives for reliable water supplies. Underlying these parts are essential activities that provide support for the Framework over the long term. A number of the water plan's recommendations focus on these essential support activities (see Chapter 5 Implementation Plan for details). The essential support activities are:

- Provide State Government Leadership and Develop Funding Methods to provide more effective leadership, assistance, and oversight in order to gain efficiency, clarify roles and responsibilities, develop funding strategies, and clarify the role of public investments

Box 2-8 Benefit-based Approach for Financing

The use of a benefit-based approach for financing will involve certain requirements. Cost-benefit analysis should ensure that the value of a project is greater than its costs and non-monetary benefits are captured in the process. Because the nature of certain types of benefits will not always allow for comparison of costs and benefits on a dollar-for-dollar basis, it is crucial that decision-makers carefully characterize all project benefits and that potential beneficiaries participate in determining how much they are willing to pay for specific levels of those benefits.

Fundamental to all these activities is a need for clear, consistent, and mutually agreed-upon terms that can be used in discussions and decision-making about financing. Terms such as benefit and baseline must be defined or replaced to ensure that all groups participating in project financing have a consistent frame of reference. In addition, principles of environmental justice must be used to protect groups such as disadvantaged communities from being unfairly burdened by project costs.

As part of a benefit-based process, public funds should be used responsibly and not create unfair advantages for private interests. Public funds should be used to pay for project actions that lead to broad public benefits, such as ecosystem restoration or other benefits that cannot be linked to a particular set of beneficiaries. The exceptions to this include actions that initiate local investment in new water management approaches and technology and situations where environmental justice calls for public assistance to help communities in need.

- Invest in Promising Technology to capitalize on new water technologies, increase scientific understanding, adapt for global climate change impacts, and improve water data management and analyses
- Ensure Equitable Decisions by increasing tribal participation and access to funding and assuring water decisions are equitable across all communities.

Provide State Government Leadership and Develop Funding Methods

California has a large network of complex water systems with a highly decentralized system of governance involving State and federal agencies; thousands of local agencies, governments, and private firms; and millions of households and farms. The differing roles of various agencies can create coordination problems, especially when integrating regional management efforts.

Moreover, legal mandates often prevent State agencies responsible for managing natural resources from making the tradeoffs needed for comprehensive, regional solutions to water management problems. Competing or conflicting agency mandates often complicate coordination of regional efforts. Also, these mandates and agency organizational structures can impede communication and cooperation between the numerous State agencies and departments responsible for water resource management. State government should realign its expertise and resources to better support

integrated regional water management, both by integrating the activities of government agencies and by developing better methods for financing water management projects.

To begin to address the maze of roles and jurisdictions governing water management in California, State government should lead an effort to examine where the mandates and jurisdictions of State, federal, and local governments and agencies managing water resources conflict with or complement each other. Efforts should include providing timely regulatory approvals and preventing conflicting rules or guidelines.

One of the key problems facing policymakers is deciding who ultimately should pay for the different actions needed to improve California's water management system. A great deal of debate surrounds the State and federal roles in funding local and regional projects, and local, State, and federal governments and water agencies all have significant financing and implementation roles. The CALFED Bay-Delta Program has advanced a benefit-based approach where costs are repaid in a way that considers what groups are receiving the benefits and the relative magnitude of those benefits obtained by each beneficiary. (See Box 2-8 Benefit-based Approach for Financing and also Volume 4 Reference Guide article "Financing Strategies and Guidelines for Water Resource Projects."). A benefits-based approach, used in conjunction with the principles of fairness and environmental justice, should serve as a solid foundation for financing water resource projects throughout the state. The 2005-2006 State Legisla-

Box 2-9 Long-term, Reliable, and Stable Funding Sources for California Water Management

California must make significant investments in its water management system in order to assure a vital economy, a healthy environment, and a reliable water supply for its citizens. No single source of funding will meet these needs. Instead, a mix of federal, State, and local (public and private) funds will be needed to assure adequate investment.

A realistic funding strategy requires long-term, reliable, and stable funding sources for California water management. Two widely agreed upon components of a realistic funding strategy are:

- Local public and private funding is most appropriate for water projects and programs that provide directly assignable water supply reliability benefits to specific water users. Sources of local public and private funding include local water use fees, assessments, and locally financed bonds.
- Statewide public funding is best used for the broadest public benefits, such as enhancing our environment, protecting the quality of the state's water supplies, and advancing water management initiatives of statewide importance. Sources of statewide public funding include general obligation bonds, revenue bonds, State General Fund, and federal appropriations.

continued

ture is considering Senate Bill 113 (Machado), related to the beneficiary pays principle: “The bill would provide that, for the purposes of implementing the act and subject to certain exceptions, State funds shall fund projects that have public benefits, non-State funds shall fund projects that have private benefits, and both project beneficiaries and the public are responsible for costs associated with a project that has both private and public benefits.”

In order to develop reliable, long-term funding sources for water initiatives in California, State government should use alternative financing methods such as revenue bonds, regional partnerships, joint powers authority bond pooling arrangements, infrastructure-for-water transfers, and other innovative techniques. User fees, suggested under the CALFED Bay-Delta Program, should also be considered as a potential long-term funding source. **While general obligation bonds will continue to have a place in water project financing, new methods that follow a benefit-based approach broaden the portfolio of funding tools available to the State.** (See Box 2-9 Long-term, Reliable, and Stable Funding Sources for California Water Management.)

To meet future governance and funding challenges, the following near-term activities are recommended:

- State government should continue to provide leadership, assistance, and oversight to protect public health and safety, especially with regard to drinking water quality, dam safety, and flood management.
- State government should provide technical assistance for efforts involving interregional, interstate, or international issues or for efforts creating broad public benefits.
- State agencies should integrate their expertise and resources to support integrated regional water management.
- State government should lead an effort to examine where the mandates and jurisdictions of State, federal, and local governments and agencies conflict with or complement each other to streamline and coordinate the roles and jurisdictions governing California water management.
- State government should use a benefit-based approach to develop long-term, reliable funding sources for water projects in a way that accurately characterizes benefits, uses public funds responsibly, and follows the principles of equity and environmental justice.

Invest in New Water Technology

California must capitalize on promising technologies, increase our scientific understanding, and improve data management and analysis to support better business and policy decisions related to water resources. To produce and carry out useful integrated water management plans, managers and planners need access to promising and affordable water technologies, as well as current, accurate data and reliable analytical tools to evaluate the benefits and risks of planned water management actions. Knowledge from such evaluations allows water managers to make better decisions.

Box 2-9 continued from previous page

To provide a base level funding source, California Department of Water Resources proposes the establishment of a new investment fund that would be sustained primarily through a modest fee on each retail water bill. The fee will provide a stable base level of funding to supplement and leverage other State and local funding. The fee will generate annual funds towards implementation of integrated regional water management plans throughout the state and in advancing statewide water management initiatives. The Department of Water Resources also proposes using general obligation bonds to provide water management investments under the new fund. Most of this bond money would provide grants to communities and regions, and would leverage substantial local investments.

Cost estimates for implementing all the strategies in California Water Plan Update 2005 range from about \$40 billion to \$120 billion over 25 years. However, the overlap among some strategies (such as conservation and recycling) means that not all strategies need be fully implemented. The new investment fund, periodic general obligation bonds, federal appropriations and local financing together could provide reliable and stable water management funding in a range of \$2 billion to \$3 billion per year, making a 25-year investment of about \$50 billion to \$75 billion achievable.

State government should invest in research and development for promising water technologies and those that improve our ability to predict the effects of global climate change. State government should also encourage pilot projects and focused research incorporating knowledge and experience specific to each region (see Box 2-10 Case Study of State Investment in Research and Development). For its part, DWR will carry out the following actions in the near-term:

- DWR will work with other State agencies to develop biannual reports on the impacts of global climate change, including impacts to water supply, and will prepare and report on mitigation and adaptation plans in accordance with Executive Order S-3-05 signed by the Governor of California June 1, 2005.
- DWR will work with other State agencies to develop and help implement strategies to reduce greenhouse gas emissions in the State in accordance with the goals established by Executive Order S-03-05. DWR will provide expertise to help identify means of energy savings for the storage, conveyance, distribution, and use of water. DWR will describe the energy use characteristics of various resource management strategies in the next California Water Plan.
- DWR will evaluate management responses to potential impacts of global climate change on the State Water Project and California's hydrology.
- DWR will work with California research and academic institutions to identify and prioritize applied research projects.
- DWR will work with other State agencies and in coordination with the Interagency Ecological Program and CALFED Science Program to invest in a broad and diverse scientific agenda that will fill the gaps of knowledge about California's water resources.
- DWR will work with State agencies to help in the collection of data and analysis of instream flows.
- The Resources Agency should continue to support development and use of statewide natural resource databases, analytical tools and evaluation criteria to identify priorities for ecosystem restoration and provide information to planners and decision-makers. This investment would provide a coordinated and comprehensive ecosystem restoration plan for the entire state by region. See other recommendations of Resource Management Strategy Ecosystem Restoration in Volume 2, Chapter 9.

Box 2-10 Case Study of State Investment in Research and Development

As part of the deregulation of California's electric power sector in the late 1990s, the Legislature and Governor established within the California Energy Commission the Public Interest Energy Research (PIER) Program to offset the reduction of certain resources, including the expected loss of research-and-development resources provided by Investor-Owned Utilities (IOUs). The PIER Program mission is to support research, development, and demonstration (RD&D) activities that are not otherwise adequately supplied by energy markets, such as energy planning and forecasting, efficiency, reliability, and environmental benefits and impacts.

Through partnerships with organizations in various economic sectors, the PIER program focuses primarily on six subject areas: renewable energy; environmentally preferred advanced generation; buildings end-use energy efficiency; demand-side technologies (which include pollution mitigation, pumping, and water treatment technologies); energy-related environmental research; and energy systems integration. The Legislature has authorized approximately \$60 million per year for PIER through 2012, funded by an electrical consumption surcharge collected via the IOUs. Funding decisions incorporate an open stakeholder-based process to help identify RD&D needs, seek to leverage research funds with other sources and organizations, and use an independent program review and evaluation process. Of course, beyond the PIER Program, other RD&D models exist, including water industry organizations such as the National Water Research Institute, academic institutions such as the International Center for Water Technology at California State University, Fresno, and federal agencies operating pursuant to the Federal Technology Transfer Act.

Box 2-11 Consideration of All Competing Needs

Environment, economy, and social equity—known as the three E’s—are vehicles to sustainability and help ensure that competing needs are met when evaluating and implementing the management strategies included in integrated resource planning. Many agencies already consider these factors in their resource evaluations. In most areas of government decisions, the application of environmental justice policy takes place at the local level.

Environmental Evaluation

As the linkage between water management and the health of the natural infrastructure are understood, the benefits of restoration to water supply reliability and water quality improvements become increasingly evident. Environmental evaluation begins with recognition that “environment” consists of both the natural environment and the environment built by people so they can live, work, and produce. Environmental evaluation includes an assessment of environmental protection and ecosystem restoration opportunities relative to water supply reliability and water quality. Storing and transporting water from one part of the environment for use in another creates change, which needs to be evaluated. Change in water use affects water quality and ecological, hydrological, biological, and other environmental resources in the natural and the constructed environment. Tradeoffs between existing and new water uses need to be evaluated. Water uses that benefit the natural environment must be considered even if they adversely impact agricultural and urban water users. In addition, when changes in trust-protected resources are proposed, public trust values must be considered and protected when feasible.

Social Equity Evaluation

The environmental justice movement began as a grassroots response to unequal enforcement of environmental, civil rights, and land use laws. The most obvious disparities involved environmental harms and benefits (for example, water quality) affecting some communities, faulty assumptions in risk assessment, discriminatory land use practices, and exclusionary policies and practices that limit public participation. Disparities can be less obvious when it comes to water use and allocation. For example, third party impacts from transferring water from agriculture to accommodate urban growth can disproportionately impact migrant worker communities. Although the relevance of environmental justice in this case is limited to the extent that economic conditions drive human and environmental health, the State has enacted eight laws specifically regarding environmental justice since 1999 (see Volume 4 Reference Guide article “Environmental Justice in California Government”).

Economic and Financial Evaluation

Economic evaluation includes a range of considerations such as capital, operations, maintenance, mitigation, and financing. Capitalization of annual costs and benefits is also necessary because it provides a common basis for comparing alternatives that are subject to (1) benefit-decay (for example, some plumbing retrofit incentives) and (2) inter-annual variability of costs and benefits.

Historically, water agencies have primarily accounted for the direct construction and operation costs of additional water supply facilities. Today, most cost accounting also includes demand management programs and project mitigation costs. Increasingly, people are identifying additional costs for more complete mitigation they believe should be included in cost accounting for water systems.

Beyond quantification, how the costs and benefits are allocated among stakeholders is an important component of any plan. Cost recovery mechanisms must be framed and in place prior to implementation. In addition, nonmonetary costs and benefits must be taken into account.

Water managers need the data and advanced modeling tools to answer a complex array of questions about water use patterns, surface water and groundwater interactions, water quality, and the environmental and economic effects of water management decisions. For planning purposes the data and analytical tools must help planners predict a range of plausible future conditions and interactions on statewide and regional levels; they must enable planners to compare outcomes of various combinations of water resource management strategies. To begin tailoring data and analytical tools for use in predicting plausible future conditions and interactions on statewide and regional levels, DWR will carry out the following actions:

- DWR with regional input will develop a general checklist of issues, resources, data, and analytical tools as well as guidelines to aid regional integrated resource planning.
- DWR will select and/or develop the analytical tools and data in support of the next water plan update.
- DWR will develop the Water Plan Information Exchange (Water PIE) for collecting and sharing data and networking existing databases and Web sites, among State, federal, regional, and local agencies and governments and citizen monitoring efforts, to improve analytical capabilities and developing timely surveys of statewide land use, water use, and estimates of future implementation of resource management strategies.
- DWR will participate in efforts by the California Water and Environmental Model Forum to develop a vision and carry out a plan for long-term improvement of analytical tools and data for statewide planning.

Because State government is responsible for evaluating the interaction of water supplies between regions, it must assess the potential system-wide impacts and tradeoffs of proposed integrated regional water resource management plans to help ensure that, taken together, they will protect public trust resources and provide for beneficial use of water supplies. To accomplish this, **State government should invest in cooperative data collection and management for regional integrated water management plans.** At a minimum, this investment of resources should develop data standards, improve water data management systems, and expand and simplify public access to water resource data.

Ensure Equitable Decisions

To provide reliable, affordable, good quality water from a diversity of sources and design comprehensive, integrated regional water management plans that are likely to succeed, California water planners and decision-makers must consider all competing needs and develop plans that take into account potential impacts on social equity, as well as the environment and the economy. Water management decisions that adversely affect disadvantaged communities can incur costs that ripple through broader, regional communities and undermine long-term, sustainable water resource use. (see Box 2-11 Consideration of All Competing Needs).

As much as possible, **water managers evaluating water management strategies must make decisions that promote environmental protection, ecosystem restoration, social equity and environmental justice** — the fair treatment of people of all races, cultures, and incomes with respect to the development, funding, and implementation of resource management projects. The following actions are recommended to promote equitable water management decisions:

- DWR and other State agencies should invite, encourage, and assist tribal government representatives to participate in statewide, regional, and local water planning processes and access State funding for water projects.
- State agencies should include tribal water concerns and water uses in future water plan updates and should engage appropriate local, State, and federal agencies to resolve tribal water issues that are identified.
- DWR and other State agencies should encourage and assist representatives from disadvantaged communities and vulnerable populations, and the local agencies and private utilities serving them, to participate in statewide, regional, and local water planning processes and to get equal access to State funding for water projects.

Looking to the Future

California needs sustainable water uses and reliable water supplies through 2030. Californians can secure this water supply for the future by making the right choices and the necessary investments. To ensure that water use is sustainable, California groundwater and surface water management must be based on three foundational actions: use water efficiently, protect water quality to get maximum utility from existing supplies, and manage water in ways that protect and restore the environment. These actions support two initiatives that water management must pursue to ensure reliable water supplies: first, promote and practice integrated regional water management; and second, maintain and improve statewide water management systems, the backbone of water management in California.

California faces big water management challenges in the future, especially during extended drought periods and flood events. Fortunately, there are tools available to cope with these challenges. There are a host of strategies that will help ensure successful management of groundwater and surface water and related natural resources. Californians need only to marshal the cooperation and dedication to implement these strategies.

In future Water Plan updates, we will refine our ability to measure water use and project the effects of our management strategies. For now, California Water Plan Update 2005 provides a guide to invest in the right choices so our state has the water needed for our people, our growing economy, and the environment in the years to come. Working together, we can secure our water future for the next generation of Californians.